

Differentiation of *Oncorhynchus mykiss* Associated with the Hells Canyon Complex Using Allozyme Electrophoresis (E.3.1-7, Chapter 3)

John W. Anderson

AFS Certified Fisheries Scientist

Cold Stream Consulting, P.O. Box 575 Baker City, OR 97814

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I. Introduction

Redband rainbow trout are a species of concern for the USFWS and are on the USFS list of sensitive species.

“A purpose of this study was to extend, using electrophoretic analysis of proteins, the investigations of Wishard et al. (1984) and Williams et al. (1996) to populations in the Snake River drainage further downstream. We were interested not only in whether the populations sampled represented redband trout populations or ones hybridized with non-native trout, but also in how much genetic divergence exists among the populations identified as redband trout. If relatively little genetic differences exist among the populations, then it may be appropriate to formulate management and conservation plans on a regional basis. In contrast, if relatively The rainbow trout populations within and tributary to the three Hells Canyon reservoirs were sampled to determine their genetic characteristics. Substantial genetic divergence exists among populations, then it would probably be more prudent to establish management and conservation plans on a more localized scale.” (Page 2, Paragraph 4)

II. Conclusions

1. The following conclusions are a synthesis of the discussion of extensive technical scientific information presented in the results and discussion section. A conclusion section was not presented.

- Both coastal and redband rainbow trout stocks are represented in the gene pool.
- There appear to be migratory rainbow trout that spawn in the tributaries and rear in the reservoirs.
- There are resident redband rainbow trout populations in the tributaries that are isolated (usually above barriers), do not migrate to the reservoirs, and seldom interchange genetic material with the migratory redband rainbows.
- The coastal rainbow trout genes appeared in trout from Brownlee Reservoir, Connor Creek, Dennett Creek, Oxbow Reservoir, Spring Creek, and lower Wildhorse River. It is probable that they are the result of hatchery reared, coastal rainbow stocked in reservoirs by fishery agencies.

- The majority of the tributaries sampled had redband trout present and included: Middle Fork Brownlee Creek, Dukes Creek, Hells Canyon Reservoir, Indian Creek, Pine Creek and tributaries (Clear Creek, Elk Creek and East Fork Pine Creek), Powder River, Rock Creek, Sheep Creek, Sturgill Creek, Wildhorse River and its tributaries (Bear Creek, Crooked River, and Lick Creek).
- Hatchery strains at Oxbow and Pahsimeroi hatcheries were determined to be Columbia River redband and would be genetically suitable for introduction into the HCC.

Response: The BLM agrees with the findings of the study.

III. Study Adequacy

The BLM agrees with the study findings. However the study should have provided a summary of conclusions sections. The samples collected by the Applicant were adequate to conduct a thorough analysis by University of Montana researchers. The findings will provide useful information for management agencies concerned with the relicensing. The movements of the migratory form of the redband rainbow trout to and from the tributary streams are not adequately investigated.

IV. BLM Conclusions and Recommendations

Conclusions

The rainbow trout collected by the Applicant's research personnel were preserved and sent to the Wild Trout and Salmon Genetics Laboratory Division of Biological Sciences at the University of Montana for analysis. The analysis is thorough and complete. The use of allozyme electrophoresis is clearly explained and is a valid scientific technique used for genetic differentiation of fish stocks of the same species.

Report Findings and Recommendations

- The analysis found the presence of coastal rainbow genes in Oxbow and Brownlee reservoirs. However, it could not be determined whether the fish were hybridized or an admixture of Columbia redband rainbow and coastal rainbow trout.
- Samples from Connor Creek, Dennett Creek, Spring Creek, and Lower Wildhorse River appear to have come from randomly mating hybridized populations of Columbia River redband and coastal rainbow trout in which essentially all individuals are of hybrid origin.
- Whether some or all of the populations may be slightly hybridized with coastal rainbow trout cannot conclusively be excluded with the available data.
- The analysis documents that there are resident and migratory populations of native redband rainbow trout inhabiting the tributaries and mainstem of the Snake River in the HCC.
- Oxbow and Pahsimeroi hatchery strains of fish have very little divergence from wild redband rainbow trout and would have little genetic impact on them.
- There are recommendations for developing different management strategies for resident and migratory forms of the redband rainbow trout in the HCC. This

- includes not stocking current hatchery strain redband trout compatible with migratory populations in areas inhabited by resident populations.
- Within the Hells Canyon Complex reservoirs the use of multiple hatchery populations to protect genetic integrity appears to be warranted.

Recommendations

1. Additional studies should be conducted to determine relative timing, abundance, and size distribution of the migratory redband trout within and below the Hells Canyon Complex.
2. BLM should recommend that future stocking of rainbow trout use sterile triploid fish or compatible redband trout stocks.